REMARKS

The present Amendment amends claims 1, 3, 10, 12 and 19-23 and leaves claims 4-7, 9, 13-16, 18 and 24 unchanged and adds new claims 25-38. Therefore, the present application has pending claims 1, 3-7, 9, 10, 12-16 and 18-38.

Applicants note that the Form PTO-1449 submitted with the filing of the application incorrectly identified a reference as 2002-330924 instead of 2000-330924. In the outstanding Office Action the Examiner initialed the Information Disclosure Statement. However, so as to make the record clear attached herewith is a new Form PTO-1449 properly listing the reference 2000-330924. Although the Examiner apparently has already considered this reference, the Examiner is respectfully requested to initial the attached Form PTO-1449 and enter it into the record so that the status of consideration of the cited reference is clear.

Claim 9 stands objected to due to informalities noted by the Examiner in paragraph 3 of the Office Action. Amendments were made to claim 9 to correct the informalities noted by the Examiner. Therefore, this objection is overcome and should be withdrawn.

Claims 1, 3, 4, 6, 7, 9, 10, 12-16 and 18-24 stand rejected under 35 USC §102(b) as being anticipated by Takahashi (U.S. Patent No. 6,259,705 B1) and claim 5 stands rejected under 35 USC §103(a) as being unpatentable over Takahashi in view of Bare (U.S. Patent No. 6,456,597 B1). These rejections are traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 1, 3-7, 9, 10, 12-16 and 18-24 are not taught or suggested by Takahashi or Bare

whether taken individually or in combination with each other as suggested by the Examiner. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw these rejections.

Amendments were made to each of the claims so as to more clearly recite features of the present invention regarding the processes that are performed upon detection of congestion in the paths. These processes are performed, for example, by the storage management device 2, recited in the claims as the third device or computer, the master storage device 1, recited in the claims as the first device of first storage device, or the controller 107, recited in the claims as the control unit all being illustrated in Figs. 1, 2A and 2B. These processes include storing information according to a predetermined ratio and changing the predetermined ratio according to a predetermined change rate when a change in the predetermined ratio is required. The change rate is illustrated, for example, in Fig. 4b as element 2217.

As now more clearly recited in the claims, the predetermined ratio is defined as amount of communications to be allocated on each of the paths relative to a total amount of communications on all of the paths. Thus, for example, according to the present invention if three different paths are provided, then the three different paths could have predetermined ratios of, for example, 20 units of communications relative to a total amount of 100 units of communications, 30 units of communication relative to total amount of 100 units of communications, and 50 units of communications relative to a total amount of 100 units of communications. In other words, the paths would have predetermined ratios of 20%, 30% and 50% respectively.

Further, according to the present invention the predetermined change rate which is applied to the predetermined ratio could, for example, describe that the rate of change of the predetermined ration is 10 units. Thus, when the predetermined change rate is applied to the first path, the amount of communications would be set to increase or decrease by 10 units. Therefore, the changed predetermined ration is either 10% or 30%.

Further, according to the present invention as now more clearly recited in the claims when a congestion has been detected a changed predetermined ratio is computed based on the change rate and information on the changed predetermined ratio is sent to the first device or is used by the first device when transferring data from the first device to the second device. These features of the present invention are described, for example, on page 13, lines 6-17 and in the paragraph bridging pages 18 and 19 of the present application.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention as now more clearly recited in the claims are not taught or suggested by Takahashi or Bare whether said references are taken individually or in combination with each other as suggested by the Examiner.

Takahashi relates to a network load balancing between a first control unit and a plurality of second control units and discloses that a conversion information storage unit stores a correspondence relationship between the first control unit and the second control units, a distributive relay unit transfers

data from the first control unit to one or more of the second control units, a load measurement unit measures the load conditions of the respective second control units, thereby balancing, based on the measured load conditions, the correspondence relationship between the first control unit and the second control units (see col. 5, lines 18-36). In Fig. 2, of Takahashi the first control unit is the client computer and the second control units are the servers. In other words, Takahashi is concerned with the adjustment of the load balance between the servers and does not include the features of the present invention where the amount of communications on each of a plurality of paths is controlled.

In the Office Action the Examiner rejects claims 22-24 alleging that they contain similar limitations to those in claims 15, 16, and 18. However, the content of claims 22-24 is entirely different from that of claims 15, 16 and 18. For example, claim 22 discloses reducing a factor among paths, which is assigned to a path in which congestion has occurred, at a designated change rate and allocating the reduced amounts to the other paths, while claim 15 discloses that the first device judges that congestion has occurred in the plurality of paths in the case in which a response is not returned from the second device for a predetermined period. Thus, claims 22-24 contain subject matter different from claims 15, 16, and 18 and as such should be examined according to such differences. Therefore, the allegations by the Examiner that claims 22-24 contain similar limitations to those in claims 15, 16, and 18 are incorrect.

As now more clearly recited in the claims the present invention is directed to a system where a first device transfers data to a second device via

a plurality of paths, wherein a third device includes means for managing, for each path, the "predetermined ratio" of an amount of data the first device transfers to each of the paths relative to the total amount of data the first device transfers to all of the paths and "ratio change rate" employed when congestion occurs (see 222 in Fig. 2B and page 16, line 8 through page 17, line 11), and means for re-computing the predetermined ratio of each path based on the above change rate when congestion of the paths is detected (see 211 and 212 in Fig. 2B, Figs 10-12, and page 33, line 5 through page 37, line 25) and notifying the result of computation to the first device. These features of the present invention now more clearly recited in the claims are not taught or suggested by Takahashi.

Regarding difference between the present invention and Takahashi, Takahashi discloses, in col. 16 line 60 to col. 17 line 2 thereof changing (incrementing/decrementing) the number of transactions the load balancing device allocates to each server (e.g., Web server) at a predetermined rate (percentage). However, it does not teach or suggest managing the predetermined ratios defined as a ratio of an amount of data transfers on each of the paths relative to the total amount of data transferred on all of the paths and managing a change rate of the predetermined as in the present invention as recited in the claims.

According to the present invention, because the "predetermined ratio" and "predetermined ratio change rate" can be changed for each path, there is an unique advantage that data transfer can be effectively conducted using multiple paths having different bandwidths and qualities. When the paths have different bandwidths, if the "predetermined ratio" of the data transfer amount

of paths having broad bandwidths is set greater than that of paths having narrow bandwidths, the throughput of all paths improves. When the paths have different qualities, if the "predetermined ratio change rate" of the data transfer amount of the paths of good quality is set smaller than that of the data transfer amount of the paths of bad quality, even when congestion occurs in a path of good quality, the ratio of the amount of data to be transferred by the path of good quality does not necessarily have to be decremented at the same amount or rate.

Thus, Takahashi fails to teach or suggest that the first device transfers data to the second device using the plurality of paths at a predetermined ratio defining an amount of communications to be allocated on each of the plurality of paths relative to a total amount of communications on all of the paths so that communication loads on each of the plurality of paths are balanced, wherein the third device detects congestion of the plurality of paths and notifies the first device of the congestion, wherein the first device changes the predetermined ratio of each of the paths, thereby changing the amount of communications to be allocated to each of the plurality of paths, based on notification from said third device of the congestion on the plurality of paths and wherein the first device transfers data to the second device using the plurality of paths according to the changed predetermined ratio as recited in the claims.

Further, Takahashi fails to teach or suggest that the third device has information on the predetermined ratio and a change rate to be applied to the predetermined ratio to compute the changed predetermined ratio, when a change in the predetermined ratio is required, wherein the third device, when

congestion of the plurality of paths has been detected, computes the changed predetermined ratio on each of the paths based on the change rate, and sends information on the changed predetermined ratio to the first device, and wherein the first device transfers data to the second device using the plurality of paths based on the changed predetermined ratio on each of the paths as recited in the claims.

Therefore, Takahashi fails to teach or suggest the features of the present invention as recited in the claims and as such does not anticipate nor render obvious the claimed invention. Accordingly, reconsideration and withdrawal of the 35 USC §102(b) rejection of claims 1, 3, 4, 6, 7, 9, 10, 12-16 and 18-24 as being anticipated by Takahashi is respectfully requested.

The above noted deficiencies of Takahashi are not supplied by any of the other references of record. Particularly, the above noted features of the present invention as recited in the claims shown above not to be taught or suggested by Takahashi are also not taught or suggested by Bare. Thus, combining the teachings of Takahashi and Bare in the manner suggested by the Examiner in the Office Action still fails to teach or suggest the features of the present invention as clearly recited in the claims.

Bare is merely relied upon by the Examiner for an alleged teaching of providing a notification by an SNMP Trap.

However, at no point is there any teaching or suggestion in Bare of the above described features of the present invention now more clearly recited in the claims. Particularly, there is no teaching or suggestion in Bare of the above described features of the present invention as now more clearly recited in the claims regarding a management device and a storage management

system for managing transmissions on a plurality of paths connected between first and second devices taking any congestions on the paths into account, wherein the first device conducts remote copy operations to the second device using the managed paths as recited in the claims.

Thus, as is clear from the above, Bare suffers from the same deficiencies relative to the features of the present invention as now more clearly recited in the claims as Takahashi.

Therefore, since Takahashi and Bare suffer from the same deficiencies relative to the features of the present invention as now more clearly recited in the claims, combining the teachings of Takahashi and Bare in the manner suggested by the Examiner in the Office Action does not render obvious the claimed invention. Accordingly, based on the above, Applicants respectfully request reconsideration and withdrawal of the 35 USC §103(a) rejection of claim 5 as being unpatentable over Takahashi in view of Bare is respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references utilized in the rejection of claims 1, 3-7, 9, 10, 12-16 and 18-24.

In view of the foregoing amendments and remarks, applicants submit that claims 1, 3-7, 9, 10 and 12-16 and 18-24 are in condition for allowance. Accordingly, early allowance of claims 1, 3-7, 9, 10 and 12-16 and 18-24 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection

with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (TMI-5039).

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.

Carl I. Brundidge
Registration No. 29,621

CIB/jdc
(703) 684-1120